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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Geoff W. Taylor et al.

SERIAL NO.: 10/700,016 GROUP ART UNIT: 2811

FILED: November 3, 2003 EXAMINER:

FOR: P-Type Quantum-Well-base Bipolar Transistor Device Employing Interdigitated Base and Emitter Formed with a Capping Layer

ATT'Y DOCKET: OPE-026

I hereby certify that this correspondence is being deposited on this day with the United States Postal Service as first class mail in an envelope addressed to : Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Jay P. Sbrollini Oct. 14, 2004

Jay P. Sbrollini Date
Reg. No. 36,266

Honorable Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

SUBMITTAL OF DOCUMENTS PURSUANT TO DUTY OF DISCLOSURE

Pursuant to applicant's duty of disclosure 37 CFR Section 1.56, enclosed is a completed form PTOL-1449 as well as copies of the cited documents which relate to the above-referenced patent application. Since this document submittal is being presented prior to the first examination on the merits, no fee is due herewith.

The article entitled "10-Gb/s High-Speed Monolithically Integrated Photoreceiver Using InGaAs p-i-n PD Planar Doped InA1As/InGaAs HEMT's" describes a long wavelength monolithically integrated photoreceiver which is capable of operation at a 10-Gb/s NRZ light signal.

The paper entitled "10-Gbit/s InP-Based High-Performance Monolithic Photoreceivers Consisting of p-i-n Photodiodes and HEMT's" describes results that demonstrate the feasibility of using receiver OEIC's fabricated using a stacked layer structure of p-i-n photodiodes and HEMT's grown on INP substrates by single-step MOVPE.

The article entitled "10 Ghz Bandwidth Monolithic p-i-n Modulation-doped Filed Effect Transistor Photoreceiver" describes the fabrication of a photoreceiver circuit using an InGaAs p-i-n photodiode in GaAs/InA1As pseudomorphic modulation-doped field effect transistor (MODFET) based preamplifier.

The article entitled "20 Gbit/s Long Wavelength Monolithic Integrated Photoreceiver Grown on GaAs" describes the fabrication of the first 20 Gbit/s 1.3-1.55$\mu$m wavelength monolithic integrated photoreceiver grown on GaAs substrate using A1GaAs/Ga HEMTs.

The article entitled "Monolithic Integrated Optoelectronic Circuits" describes monolithic integration of lasers and photodetectors with electronic circuits promising higher bandwidth, improved manufacturability, smaller size, lower power and hence lower costs.

The article entitled "Heterojunction Field-Effect Transistor (HFET)" proposes a new form of FET for implementation in a heterojunction material system such as A1GaAs/GaAs.

The paper entitled "High Temperature Annealing of Modulation Doped GaAs/A1GaAs Heterostructures for FET Applications" describes high temperature annealing done on modulation doped GaAs/A1GaAs heterostructures by employing arsenic-overpressure capless annealing.

The article entitled "Submicrometre Gate Length Scaling of Inversion Channel Heterojunction Field Effect Transistor" describes the scaling to 0.5$\mu$m of the inversion channel HFET with a single strained InGaAs quantum.

The article entitled "Theoretical and Experimental Results for the Inversion Channel Heterostructure Field Effect Transistor" presents new theoretical and experimental findings for the inversion channel HFET to address the modelling needs of inversion channel opto-electronic integrated circuits (OEICs).

This article entitled "Transmitting Transistor Design" RF Transmitting Transistor and power amplifier fundamentals describes the design of the transistor system.

This article entitled "Thermally stable ohmic contacts to n-type GaAs. VIII. Sputter-deposited InAs Contacts"; by Hallili et al. discloses the electrical properties and structure of this system.

This article entitled "Thermally stable ohmic contacts to n-tyupe GaAs. IX. Sputter-deposited InAs Contacts Niln(mn) and Niln(w) Contact Metals"; discloses the electrical properties and structure.

This article entitled "Transferred Substrate HBT's with 254 Gh2F" by D. Mensa et al. Discloses the structure and fundamental design.

The listed documents are brought to the Examiner's attention because they are known to the applicant and/or the applicant's attorney and may be considered by the Examiner to be material to his/her examination. This listing should not be construed as representation that a search has been made or that no better art exists. No inference should be made that the documents are in fact material merely because they are referenced herein.

Moreover, no representation is made that the brief descriptions, if any, of the references necessarily describe the most material aspects of the references. Further, by this listing, the applicant is not making any admission regarding the relative dates of the invention and listed disclosures.

Respectfully submitted,

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| INFORMATION DISCLOSURE CITATION<br><br>PAGE 1 OF 3 | Atty Docket No.<br>OPE-026 | Serial No.<br>10/700,016 |
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| | Applicant<br>Geoff W. Taylor et al. | |
| | Filed<br>November 3, 2003 | Group |

US PATENT DOCUMENTS

| Examiner Initials | | Document No. | Date | Name | Class | Sub-class | Filing date if approp. |
|---|---|---|---|---|---|---|---|
| | A | 3,919,656 | 11/11/75 | Sokal et al. | 330 | 51 | |
| | B | 4,424,525 | 1/3/84 | Mimura | 357 | 23 | |
| | C | 4,658,403 | 4/14/87 | Takiguchi et al. | 372 | 96 | |
| | D | 4,683,484 | 7/28/87 | Derkits, Jr. | 357 | 16 | |
| | E | 4,806,997 | 2/21/89 | Simmons et al. | 357 | 16 | |
| | F | 4,814,774 | 3/21/89 | Herczfeld | 342 | 372 | |
| | G | 4,827,320 | 5/2/89 | Morkoc et al. | 357 | 22 | |
| | H | 4,829,272 | 5/9/89 | Kameya | 333 | 139 | |
| | I | 4,899,200 | 2/6/90 | Shur et al. | 357 | 30 | |
| | J | 4,949,350 | 8/14/90 | Jewell et al. | 372 | 45 | |
| | K | 5,010,374 | 4/23/91 | Cooke et al. | 357 | 16 | |
| | L | 5,105,248 | 4/14/92 | Burke et al. | 357 | 24 | |
| | M | 5,202,896 | 4/13/93 | Taylor | 372 | 50 | |
| | N | 5,337,328 | 8/9/94 | Lang et al. | 372 | 45 | |
| | O | 5,386,128 | 1/31/95 | Fossum et al. | 257 | 183.1 | |
| | P | 5,422,501 | 6/6/95 | Bayraktaroglu | 257 | 195 | |
| | Q | 5,436,759 | 7/25/95 | Dijaili et al. | 359 | 333 | |
| | R | 5,698,900 | 12/16/97 | Bozada et al. | 257 | 744 | |
| | S | 6,031,243 | 2/29/00 | Taylor | 257 | 13 | |
| | T | 6,043,519 | 3/28/00 | Shealy et al. | 257 | 195 | |
| | U | US 20020067877 | 6/6/02 | Braun et al. | | | |
| | V | 5,288,659 | 02/94 | Koch et al. | 438 | 31 | |
| | W | 5,452, 118 | 09/95 | Maruska | 398 | 204 | |
| | X | 5,999,553 | 12/99 | Sun | 372 | 50 | |

| EXAMINER | DATE CONSIDERED |
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INFORMATION DISCLOSURE CITATION

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| Atty Docket No. OPE-026 | Serial No. 10/700,016 |
|---|---|
| Applicant Geoff W. Taylor et al. | |
| Filed November 3, 2003 | Group |

US PATENT DOCUMENTS

| Examiner Initials | | Document No. | Date | Name | Class | Sub-class | Filing date if approp. |
|---|---|---|---|---|---|---|---|
| | A | 6,479,844 | 11/02 | Taylor | 257 | 98 | |
| | B | 6,720,584 | 04/04 | Hata et al. | 257 | 98 | |
| | C | 6,483,170 | 11/19/02 | Johansson | 257 | 580 | |
| | D | 6,239,475 | 05/29/01 | Johansson et al. | 257 | 488 | |
| | E | 6,037,616 | 03/12/00 | Amamiya | 257 | 198 | |
| | F | 5,003,366 | 03/26/91 | Mishimi et al. | 257 | 197 | |
| | G | | | | | | |
| | H | | | | | | |
| | I | | | | | | |
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|---|---|---|
| | Applicant<br>Geoff W. Taylor et al. | |
| | Filed<br>November3, 2003 | Group |

| OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.) | | |
|---|---|---|
| | AA | 10-Gb/s High-Speed Monolithically Integrated photoreceiver Using InGaAs p-i-n PD and Planar Doped InAlAs/InGaAs HEMT's by Akahori et al, IEEE Photonics Technology Letters, Vol 4, No. 7, July 1992 |
| | BB | 10-Gbit/s InP-Based High-Performance Monolithic Photoreceivers Consisting of p-i-n Photodiodes and HEMT's by Takahata et al., IEICE Trans. Electron., Vol. E83-C, No. 6 June 2000 |
| | CC | 10 Ghz Bandwidth Monolithic p-i-n Modulation-doped Field Effect Transistor Photoreceiver by Dutta et al., Appl. Phys. Lett., Vol. 63, No. 15, 11 October 1993 |
| | DD | 20 Gbit/s Long Wavelength Monolithic Integrated Photoreceiver Grown on GaAs by Hurm, et al., Electronics Letters, Vol. 33, No. 7, 27th March 1997 |
| | EE | Monolithic Integrated Optoelectronic Circuits by Berroth et al., Fraunhofer Institute for Applied Solid State Physics (IAF), Germany, IEEE 1995 |
| | FF | Heterojunction Field-Effect Transistor (HFET), Reprinted from Electronics Letters, Vol 22, No. 15, pp. 784-786, 17th July 1986 |
| | GG | High Temperature Annealing of Modulation Doped GaAs/A1GaAs Heterostructures for FET Applications by Lee et al., 1983 IEEE/Cornell Conf. On High-Speed Semiconductor Devices & Ckts, 8/83 |
| | HH | Submicrometre Gate Length Scaling of Inversion Channel Heterojunction Field Effect Transistor by Kiely et al., Electronics Letters, Vol. 30, No. 6 17th March 1994 |
| | II | Theoretical and Experimental Results for the Inversion Channel Heterostructure Field Effect Transistor by Taylor et al., IEE Proceedings-G, Vol. 140, No. 6, December 1993 |
| | jj | Transmitting Transistor Design; RF Transmitting Transistor and power amplifier fundamentals, Phillips Semiconductors; March 23, 1998 |
| | kk | Thermally Stable Ohmic Contacts to n-type GaAs. VIII. Sputter-deposited InAs Contacts; HJ Kim, Masanori Murakami, SL Wright, M. Norcott, WH Price and D. La Tulipe; 4/11/90 |
| | ll | Thermally Stable Ohmic Contact to n-type GaAs IX. Sputter-deposted InAS Contacts Niln(mn) and Niln(w) Contact Metals, J. Applied Physics, Vol. 70, 11/12/91 pgs. 7443-7448 |
| | mm | Transferred Substrate HBT's with 254 GH2F. D. Mensa et al.; Electron Lett. 4/99; 35(7) pp. 605-606 |
| | | |

| EXAMINER | DATE CONSIDERED |
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